

mounted by diffuse light from which shot innumerable bright beams. Buffalo, 26th, 9:15 to 9:30 p. m., extending from NE. to NW.; beams having an apparent rapid upward movement to an elevation of about 60°, with a slow lateral movement to the west; color, reddish tinge. Lima, N. Y., 26th, 9:15 p. m., to 10:15 p. m.; streamers 9:37 p. m.; altitude 35°. Bismarck, 27th, from 9 to 10 p. m., altitude about 5°. Trenton, N. J., 8:30 to 8:45 p. m. Burlington, Vt., 28th, from 11:15 to 11:25 p. m., pale green.

Telegraphic Communication Interfered with by Atmospheric Electricity.—Pike's Peak, 19th, 21st; Fort Sill, 26th; Mason, Tex., 1st, 4th, 27th; Boerne, Tex., 28th; Castroville, Tex., 1st, 19th, 20th, 23rd, 24th, 27th, 28th, 29th; Fredericksburg, Tex., 1st, 27th, 29th; Uvalde, Tex., 1st, 19th, 23th, 24th; Laredo, Tex., 23rd, 24th; Stockton, Tex., 4th, 6th, 12th, 13th, 17th, 18th, 19th, 23rd, 24th, 28th, 31st; Davis, Tex., 11th, 14th, 17th; Brackettsville, Tex., 2nd, 23rd, 24th, 28th; Pilot Point, Tex., 28th, 29th. McKavett, Tex., 27th, 28th; Ft. Elliott, Tex., 29th, 31st. On the summit of Mt. Washington, 12th and 26th, St. Elmo's fire appeared on tops of anemometer and anemoscope.

OPTICAL PHENOMENA.

Solar Halos were reported from the various districts on the following dates: New England, 3rd, 4th, 5th, 7th, 8th, 11th, 15th, 18th, 25th, 26th, 28th, 29th; Middle Atlantic States, 1st to 11th, 15th, 19th, 29th; South Atlantic States, 2nd, 5th, 11th, 12th, 22nd, 29th; Eastern Gulf States, 4th, 5th, 6th, 12th, 14th, 16th; Western Gulf States, 1st, 14th, 15th, 17th; Lower Lake region, 2nd to 6th, 9th to 12th, 16th to 20th, 24th, 29th, 31st; Upper Lakes, 1st, 2nd, 6th, 8th, 9th, 20th, 21st, 23rd, 25th, 29th; Ohio valley and Tennessee, 2nd, 4th, 9th, 10th, 11th, 23rd, 26th, 28th, 29th, 31st; Upper Mississippi valley, 1st, 2nd, 8th, 9th to 13th, 18th to 22nd, 25th, 29th; Missouri valley, 1st, 2nd, 5th, 7th to 10th, 15th, 17th to 22nd, 24th, 25th; Middle Plateau, 4th, 7th, 16th, 18th to 21st, 29th; California, 1st, 7th, 13th, 15th, 16th, 23rd, 24th, 29th; Oregon, 1st, 5th, 6th, 10th, 14th, 18th, 21st; Washington Territory, 15th, 18th, 19th, 21st.

Lunar Halos were reported from various districts on the following dates: New England, 2nd, 15th, 20th. Middle Atlantic States, 11th, 15th, 17th, 19th to 23rd, 29th. South Atlantic States, 21st to 26th. Eastern Gulf States, 13th to 20th, 23rd, 26th. Western Gulf States, 14th to 23rd. Lower Lake region, 17th, 19th, 23rd, 28th, 29th. Upper Lake region, 13th, 14th, 16th, 19th, 22nd. Ohio valley and Tennessee, 17th, 18th, 28th, 29th. Upper Mississippi valley, 13th, 16th to 20th; Missouri valley, 3rd, 16th to 22nd, 24th. Rocky Mountains, 16th to 21st. Middle Plateau, 17th, 19th, 24th. Pacific coast, 14th, 15th, 17th, 18th.

Mirage.—North Platte, 3rd; Ft. Niagara, N. Y., 4th, 2 p. m.

MISCELLANEOUS PHENOMENA.

Sunsets.—The characteristics of the sky at sunset as indicative of fair or foul weather for the succeeding twenty-four hours have been observed at all Signal Service Stations. Reports from 124 stations show 3,829 observations to have been made, of which 22 were reported doubtful; of the remainder, 3,142 or 82.5 per cent. were followed by the expected weather.

Zodiacal Light.—Wabash, Ind., 1st to 7th, 12th. Yate's Centre, Kan., 2nd, 3rd, 5th, 6th, 7th, 29th. Harvard College, Cambridge, Mass., looked for every clear evening but none seen; evenings of the 2nd, 6th, 8th and 10th were the only ones when the presence of the light could have been seen. Somerset and Fall River, Mass., 2nd. Oregon, Mo., 1st, 2nd, 3rd, 6th, 7th, 8th. Clear Creek, Neb., 2nd. Atco, N. J., 2nd, 3rd, 4th, 5th, 9th, 10th, 25th. Bellefontaine, Ohio, 1st, 3rd to 8th, 11th. Walnut Grove, Va., 3rd, 4th, 7th, 25th. Mr. Chas. Hasselbrink, at Havana, reports "cloudiness and moonshine have been a great hindrance to observations on the zodiacal light during the whole month of May, 1880." The zodiacal light was visible on the following dates: 1st and 2nd, of great extension, intermittent. 25th, 8 to 9 p. m., of great lateral extension and exceedingly bright; relative humidity, 78 per cent. 28th, 8:30 to 9:45 p. m., exceedingly bright and of great azimuthal extension, with the line of axis strongly inclined to the left (south); relative humidity, 82 per cent. Mr. Hasselbrink, in forwarding the above, observes "this concurrence of facts, namely, brightness, extension and humidity, strengthens my belief that the light is more visible in damp than in dry weather."

Meteors.—San Francisco, 6th, 9:30 p. m., very brilliant, course SE. to NE., burst with a loud report and with a gorgeous display of colors. North Platte, 8th. Pensacola, Fla., 6th, 7th, 9th, 24th, 28th, 31st. Little Rock, Ark., 5th, 11th, 25th, 30th. Cedar Keys, Fla., 30th. Boise City, 19th. Knoxville, 12th. Ft. Dodge, Ia., 13th, 9 p. m. Yates Center, Kan., 20th. Point Pleasant, La., 9th. Woodstock, Md., 9th, 25th, 26th, 27th. Fall River, Mass., 26th. Fayette, Miss., 5th. Corning, Mo., 27th, 31st. Clear Creek, Neb., 28th.

Prarie and Forest Fires.—Milford, Pa., 12th to 14th, "terrible forest fires," over 3 million feet of lumber, a vast amount of valuable timber and several houses and barns destroyed. Atlantic Co., N. J., 14th, the loss by fires in this county on live stock, buildings, timber, &c., is estimated at \$200,000 not including the loss of \$20,000 on the vineyard around Egg Harbor City. In Galloway township 30 buildings were burned. Gibson's Mills, N. J., 14th, scarcely an acre of timber land for miles around which has not been swept by fire, many dwellings and outbuildings burned. Alison, N. J., 14th, over 100 square miles of valuable berry-bogs, timberland and vineyards, have been destroyed. At the village of Great Republic, 22 buildings

were burned. In Ocean, Monmouth, Burlington and Cumberland Cos., the fires have been exceedingly destructive; over 18,000 acres of cedar and large tracks of vineyards have been destroyed. Observed from Pike's Peak, 5th, 11th, 12th, 13th, 14th, 16th, 17th, 24th. Colorado Springs, 15th, 24th. North Platte, 7th. Ft. Dodge, Ia., 1st, 3rd. Independence, Kan., 1st to 27th. Freehold, N. J., 6th, 9th, 10th, 12th, 15th, 16th, 17th. Atco, N. J., 6th, 12th. Walnut Grove, Va., 8th to 19th, 21st, 23rd.

Polar Bands.—Portland, Or., 12th, 17th; Riley, Ill., 14th; New Corydon, Ind., 1st, 6th, 11th, 13th, 14th, 23rd, 24th; Guttenburg, Ia., 20th; Clear Creek, Neb., 30th; Auburn, N. H., 29th; Walnut Grove, Va., 2nd.

Earthquakes.—Pt. San Jose, Cal., 5th, 11:35 p. m., slight shock. San Francisco, 5th, 11 p. m., sharp shocks in various parts of city; motion from south to north and then vertical. Newburyport, Mass., 12th, 7:45 a. m., violent shock, houses shook in many parts of the city, the accompanying noise resembling that of a heavy barrel rolling over a chamber floor. Shocks were felt at the same time in Haverhill, Groveland and surrounding towns. Billerica, Mass., 12th, slight shock at 7:30 a. m.

Locusts.—Morgantown, W. Va., 18th, first re-appearance of 17 year locusts. Their successive appearance at this station is reported as follows: May 15th, 1795; May 25th, 1812; May 25th, 1829; May 14th, 1846; May 25th, 1863; May 1st, 1880. Cedar Vale, Kan., 23rd, destructive western locust in considerable numbers.

Sun Spots.—The following record of observations, made by Mr. D. P. Todd, Assistant, has been forwarded by Prof. S. Newcomb, U. S. Navy, Superintendent, Nautical Almanac Office, Washington, D. C.:

DATE— May, 1880.	No. of new—		Disappeared by solar rotation.		Reappeared by solar rotation.		Total number visible.		REMARKS.
	Groups	Spots	Groups	Spots	Groups	Spots	Groups	Spots	
1st, 8 a. m....	0	0	0	0	0	0	1	20†	Many of the spots small.
2nd, 12 m.....	1	5	0	0	1	5	2	20†	Faculae.
3rd, 8 a. m....	0	5	0	5	0	5	3	20†	
4th, 8 a. m....	0	0	0	3	0	0	2	17†	Faculae.
5th, 5 p. m....	0	0	0	5	0	0	2	12	Broad areas of faculae.
6th, 8 a. m....	0	0	1	1	0	0	1	10	Faculae.
7th, 8 a. m....	1	4	0	0	0	0	2	14	Faculae.
9th, 10 a. m....	0	0	0	0	0	0	2	12	
13th, 12 m....	0	0	0	0	0	0	1	2	
17th, 3 p. m....	0	0	1	2	0	0	0	0	
18th, 6 p. m....	0	0	0	0	0	0	0	0	
20th, 4 p. m....	1	7	0	0	0	0	1	7	Spots small.
21st, 4 p. m....	0	0	0	0	0	0	1	2	Faculae.
24th, 6 p. m....	2	8	0	0	1	5	2	8	Broad areas of faculae.
25th, 4 p. m....	1	12	0	0	0	9	3	20†	Faculae. Many of the spots small.
26th, 5 p. m....	0	8	0	0	0	6	2	22†	Faculae. Many of the spots small.
27th, 4 p. m....	0	5	0	0	0	0	1	25†	Faculae. Many of the spots small.
31st, 8 p. m....	1	2	0	0	1	2	2	27†	Faculae. Many of the spots small.

†Approximated.

Mr. Wm. Dawson, at Spiceland, Indiana, reports:—1st, 3 groups, 60 spots. 2nd, 3 groups, 34 spots. 3rd, 3 groups, 22 spots. 5th, 3 groups, 30 spots. 6th, 2 groups, 17 spots. 7th, 3 groups, 28 spots. 8th, 2 groups, 24 spots. 12th, 3 groups, 11 spots. 13th, 2 groups, 11 spots. 14th, 2 groups, 4 spots. 15th and 17th, no spots. 16th, 1 group, 4 spots. 19th, 2 groups, 5 spots. 23rd, 1 group, 2 spots. 27th, 1 group, 40 spots. 28th, 1 group, 50 spots. 30th, 2 groups, 63 spots. 31st, 2 groups, 43 spots.

Mr. H. D. Govey, at North Lewisburg, Ohio, reports:—26th, 8:30 a. m., two large and several small spots N. of equator and near E. side. 27th, 7:45 a. m., two large spots and several groups. 29th, 7:45 a. m., two very large and several groups of smaller spots.

Mr. F. Hess, at Fort Dodge, Ia., reports: 1st, six large spots, each accompanied by a number of smaller ones, and some faculae on sun's upper half. 2nd, 6 a. m., same group in NW. quarter, and a new spot near E. limb. 3rd, 8 a. m., one large spot and faculae in NE. quarter; only three spots of the other group remain distinctly visible. 4th, only one large spot—too windy and hazy for distinct vision. 5th, 8 a. m., one very large spot with broad penumbra and a cluster of very minute spots beneath in NE. quarter; also two small spots and many faculae in NW. quarter. From the 6th to 13th, same group of one large and a cluster of small spots looking like a bunch of grapes suspended from penumbra of large spot, and some faculae visible until 13th when the cluster consolidated into one large spot. 14th, n. spots or faculae. 15th and 16th, no spots, faculae in SE. quarter. 17th and 18th, no spots or faculae. 20th and 21st, two large and a number of smaller spots amid faculae in NE. quarter, between 3' to 5' from NE. limb; at noon of the 21st only one spot about 8' from NE. limb which had also disappeared by 6 p. m. 22nd and 23rd, no spots or faculae. From the 25th to 31st, a fine group of twenty or more spots, of which five quite distinct and one very large, undergoing various changes while advancing on upper half of sun's disk. A new spot and group of faculae appeared in SE. quarter on the 30th.

NOTES AND EXTRACTS.

[From *Nature*, April 8, 1880.]

*On the Long Period Inequality in Rainfall.*¹—1. If it be true that there is a variation in the power of the sun depending on the state of his surface, this variation might naturally be expected to make itself apparent through a corresponding change in the rainfall of the earth, so that when the sun is most powerful there ought to be the greatest rainfall.